July 23, 2004

Dear Reader:

Enclosed you will find a Draft Environmental Assessment of a proposal from PPL Montana, to allow marketing, recycling and reuse of bottom ash from Units 1&2 and Units 3&4 for both on and off-site projects. PPL Montana seeks approval from the Department of Environmental Quality (Department) for an amendment of its Certificate of Environmental Compatibility and Public Need (Certificate) for Colstrip Generating Units 3&4. The Certificate issued Under Montana's Major Facility Siting Act, currently requires "That waste materials from scrubber units and boilers will be conveyed to sealed ash disposal ponds and eventually dried and the disposal ponds reclaimed." The environmental assessment contains additional details of the proposal.

The Department is providing an eight-day period in which to submit comments on the EA. The comment period will close **July 31, 2004**. Comments may be mailed to:

Tom Ring
Environmental Management Bureau
Montana Department of Environmental Quality
PO Box 200901
Helena, MT 59620-0901

Comments may also be e-mailed to: tring@state.mt.us or faxed to: (406) 444-1499 Attention Tom Ring.

This Environmental Assessment was prepared pursuant to the Montana Environmental Policy Act. This notice and a copy of the EA were filed with the Environmental Quality Council on July 23, 2004.

_____
Warren McCullough, Bureau Chief
Permitting and Compliance Division -

Department of Environmental Quality

EMB

Draft
Environmental Assessment

A Request to Use PPL Montana Units 1&2 and 3&4
Bottom Ash for On and Off-site Construction Projects

Montana Department of Environmental Quality
Environmental Management Bureau
P.O. Box 200901
1520 East 6th Avenue
Helena, MT 59620-0901

July 22, 2004

TABLE OF CONTENTS

TABLES AND FIGURES

Introduction

PPL Montana (PPLM) operates a four-unit coal fired electricity generating facility in Colstrip, Montana. The Colstrip Steam Electric Station (CSES) is located in Section 34, Township 2 N, Range 41 E, Rosebud County, Montana and consists of four sub-bituminous coal-fired units. Colstrip Units 1&2, both 333-megawatt coal-fired steam electric generating units, began commercial operation in 1975. Colstrip Units 3&4 are two 800-megawatt generating units adjacent to Units 1&2. Unit 3 has been on line since October 1983. Unit 4 came on line near the end of 1985, and began producing commercial power in April 1986.

PPLM proposes to amend its Certificate of Environmental Compatibility and Public Need for Colstrip Units 3&4. The purpose of this Certificate amendment is to allow PPLM to sell, recycle, and/or reuse the bottom ash produced by CSES Units 1, 2, 3&4 in on- and off-site projects. Current Certificate conditions require disposal of Units 3&4 bottom ash in sealed ponds. The bottom ash from Colstrip Units 1&2 has previously been recycled or reused in the manner proposed for Units 3&4. However, PPLM has halted all 1&2 bottom ash shipments pending Montana Department of Environmental Quality (Department) review and approval of this amendment application. PPLM currently utilizes Units 1&2 bottom ash for on-site dike construction within the Units 3&4 Effluent Holding Pond.

Amendment Procedures

On June 25, 2004, PPLM notified the Department of Environmental Quality (Department) that it was seeking an amendment to the Certificate to allow bottom ash from generating Units 1-4 to be marketed, recycled, or reused rather than being disposed of in sealed ponds. In addition to removing bottom ash from bottom ash ponds south of the generating units, this would include recovering bottom ash from the effluent holding pond located east of the plant site in the Cow Creek drainage (in Section 1, Township 1 N, Range 41 E and Section 6, Township 1 N, Range 42 E). PPLM published the required notice that it was seeking an amendment to its Certificate on June 24, 2004. On July 13, 2004 PPLM submitted required proof of this notice, additional analytical results and missing maps to complete its application. On July 20, 2004 PPLM responded to comments on the notice to amend offered by the Department. This proposal would result in a change of the location where bottom ash is disposed.

After the Department receives a complete notice of an amendment to a certificate, including notice to all active parties to the original proceeding, it has 30 days to determine whether the proposed change in the facility would result in a material increase in any environmental impact of the facility or a substantial change in the location of all or a portion of the facility as set forth in the certificate. In those cases in which the Department determines that the proposed change in the facility would not result in a material increase in any environmental impact or would not be a substantial change in the location of all or a portion of the facility, the Department shall automatically grant the amendment either as applied for or upon terms or conditions

that the Department considers appropriate. If the Department determines that the proposed change would result in a material increase in any environmental impact of the facility or a substantial change in the location of all or a portion of the facility, the Department would grant, deny, or modify the amendment with conditions it considers appropriate.

A person aggrieved by the final decision of the Department on an application for amendment of a certificate may within 15 days appeal the decision to the Board of Environmental Review under contested case procedures. If a hearing is requested as part of an appeal, the party requesting the hearing has the burden of showing by clear and convincing evidence that the Department's determination is not reasonable. Following the hearing, the Board would grant, deny, or modify the amendment with conditions it considers appropriate.

This draft environmental assessment provides supplemental analysis of impacts examined in the draft and final environmental impact statement for the Colstrip Units 3&4 (DNRC 1974 and 1975). It also contains the analysis on which the Department makes its determination whether there would be a material increase in any environmental impact or a substantial change in the location of all or a portion of the facility. The Department is using the environmental assessment format because the short timeframe required for the determination does not allow sufficient time for preparation of a full environmental impact statement. This approach is provided for in Administrative Rules of Montana (ARM) 17.4.607(2)(e). The following checklist environmental assessment considers only the effects that the proposed change or addition to the facility contained in the notice for the certificate amendment may produce.

Regulation of Bottom Ash from Units 1&2

The forerunner to Montana's Major Facility Siting Act, the Utility Siting Act (USA), was enacted and signed into law while Colstrip Generating Units 1&2 were under construction. Construction of certain Units 1&2 associated facilities had not yet begun, and, while the plant itself was grandfathered and not covered by the USA, the associated facilities were required to obtain a Certificate under the USA. The associated facilities include a water supply pipeline from the Yellowstone River to Colstrip, water pumps installed at the beginning of the pipeline near Nichols on the Yellowstone River, and a transmission line that serves these pumps. The Certificate for Units 1&2 does not address ash disposal ponds on the plant site or off the plant site.

When Colstrip Generating Units 3&4 were later proposed, the Major Facility Siting Act Certificate and subsequent amendments addressed the new generating facilities, associated facilities serving Units 3&4, and certain 'sludge' disposal ponds. One of the 'sludge' ponds was be located roughly three miles southeast of the plants in the Cow Creek drainage. Other 'sludge' ponds were to be located roughly 2.5 miles northwest in an unnamed tributary drainage of East Fork Armells Creek. In addition, the Certificate for Units 3&4 addressed ponds associated with Units 3&4 on a 40-acre area

immediately south of the plant. While the pond in the unnamed tributary of East Fork Armells Creek has been used mostly for ash slurry from Units 1&2, it is specifically described in the Certificate for Units 3&4, and therefore, is an associated facility covered by the Units 3&4 Certificate.

The Certificate that was issued for Units 3&4 does not specifically cover bottom ash from Units 1&2. Unless bottom ash from Units 1&2 is moved to one of the ponds specifically used to handle waste from Units 3&4, the Units 1&2 bottom ash is not covered under the Certificate for Units 3&4. As such, the portion of PPLM's current request to amend its certificate to allow use of bottom ash from Units 1&2 off-site is unnecessary.

Similarly, under the Approval with Additional Mitigations Alternative discussed later in this document, PPLM would be granted a conditional amendment that would allow it to move bottom ash from Units 3&4 bottom ash ponds to a temporary storage site in a bottom ash pond dedicated to Units 1&2. That bottom ash pond, formerly serving Units 1&2, would be covered by the Certificate for Units 3&4 if the proposed amendment were issued.

Checklist Draft Environmental Assessment

COMPANY NAME: PPL Montana Project: Amendment 3 Colstrip 3&4 MFSA Certificate to sell, recycle or reuse bottom ash from Generating Units 1-4 for on and off-site projects.
LOCATION: see figures 1, 2 and 3 County: Rosebud
PROPERTY OWNERSHIP: [ ] Federal [ ] State [x] Private

TYPE AND PURPOSE OF ACTION: PPLM proposes an amendment to the Certificate of Environmental Compatibility and Public Need (Certificate) for Colstrip Units 3&4 to allow marketing, recycling and reuse of bottom ash for both on and off-site projects. The Certificate, in finding of fact number 88 currently requires "That waste materials from scrubber units and boilers will be conveyed to sealed ash disposal ponds and eventually dried and the disposal ponds reclaimed."

Proposed Plan:

Units 3&4 employ wet venturi scrubbers with lime addition for particulate and sulfur dioxide removal. To avoid impacts to water resources in the area, PPLM operates closed-loop process water/scrubber systems. Liquid wastes from the generating plants are transported via pipelines and impounded in ponds. The pond system servicing Units 3&4 has been in use since 1983. Bottom ash and scrubber byproducts are combined at the final disposal site, the 3&4 Effluent Holding Pond (EHP). This pond is located approximately 3 miles southeast of the generating plants (Figure 1). Prior to being conveyed to the final disposal site, Unit 3&4 bottom ash is handled separately, in a smaller pond system at the generating plants making retrieval for beneficial uses possible (Figure 2).

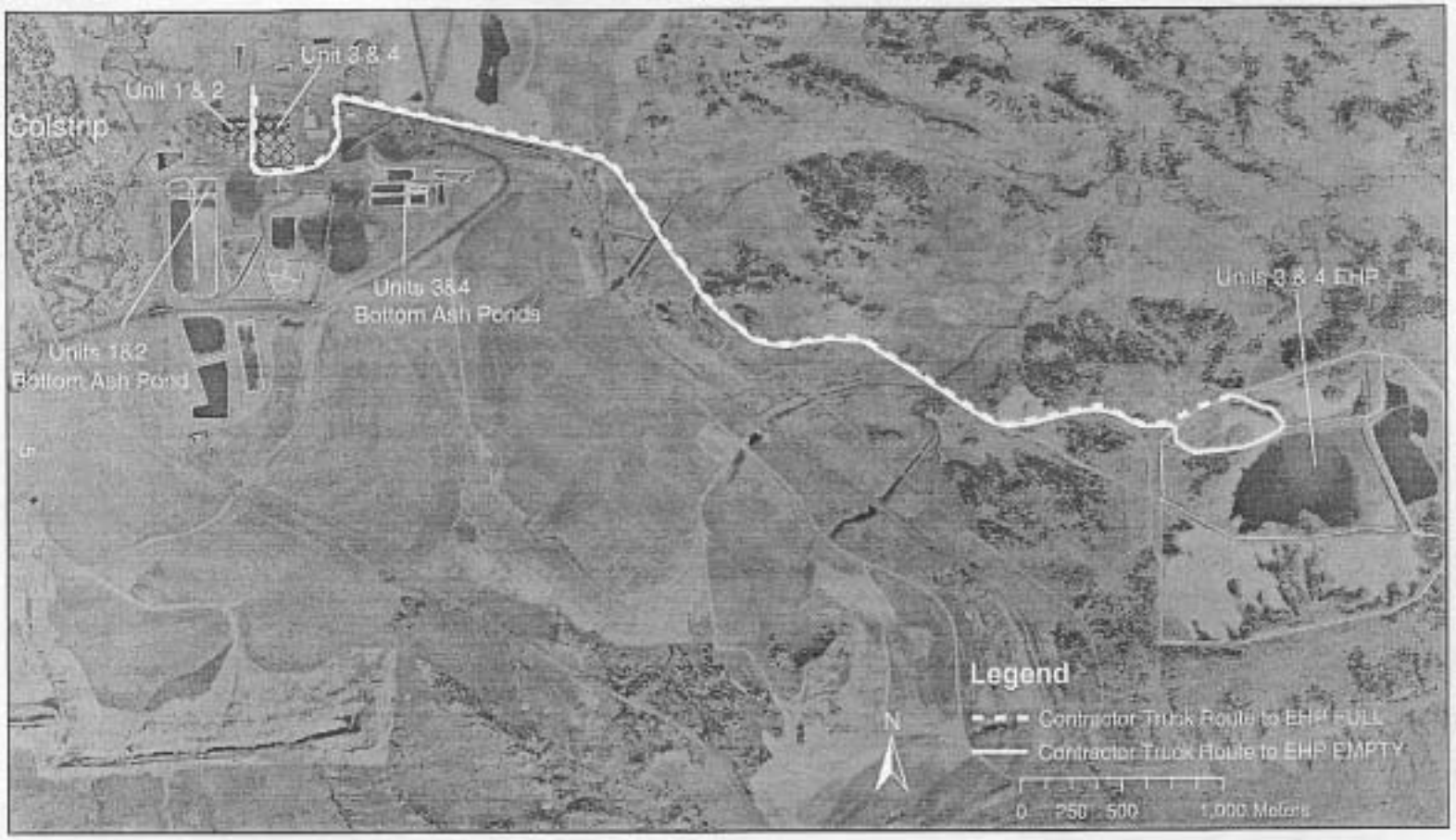
Units 1&2 also utilize wet venturi scrubbers, but lime is not added in the pollution control process. Bottom ash from these units is slurried to a small clay-lined temporary holding pond just to the southwest of the power plant (Figure 3). This temporary pond will also make the 1&2 bottom ash available for beneficial use outside the plant area.
The bottom ash settles, is dewatered, and is bulldozed into a pile for loading onto trucks. The ash is then trucked to the 3&4 EHP for dike construction within the boundaries of this pond. It normally takes three -120 ton trucks five days to move the stockpiled ash out to the 3&4 EHP.

The slurry water that carries the bottom ash to each holding pond is analyzed for 7 parameters each month. This analysis is found in Appendix A. Makeup water for the bottom ash slurry is the raw water from the Yellowstone River.

Bottom ash is gravitationally removed from the Units 3&4 boilers, mixed with water, and slurried to two clay-lined de-watering ponds called the Units 3&4 coarse bottom ash ponds (Figure 2). The bottom ash is dozed out of the holding ponds, de-watered sufficiently for loading into trucks, and hauled to the Units 3&4 Effluent Holding Pond for disposal.

Figure 1. Colstrip Site Map

Rosebud County, Montana



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USGS Digital Orthophotos (source: http://www.maps.nris.state.mt.us.8080)
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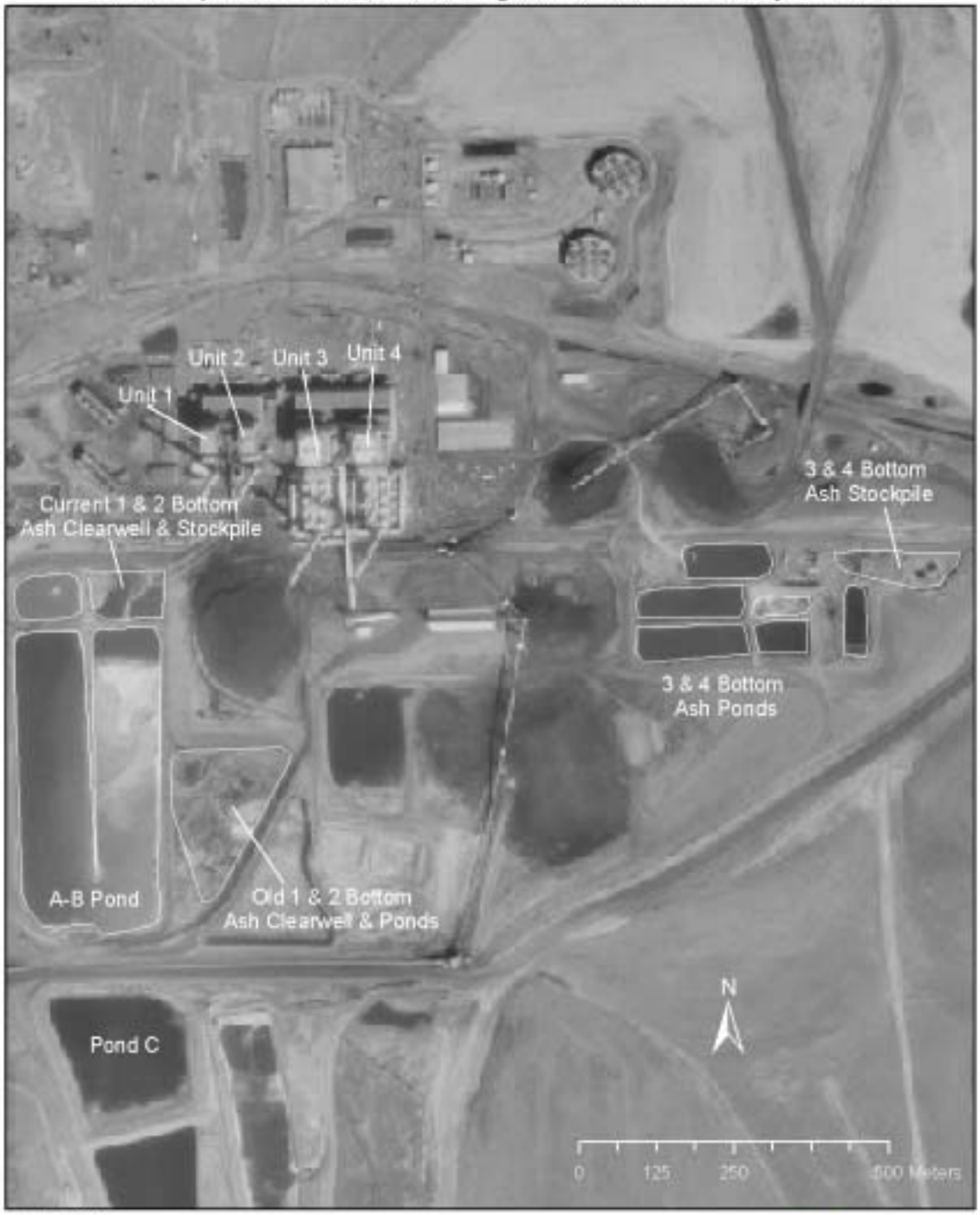
Figure 2. Bottom Ash Pond Locations

At Colstrip Steam Electric Generating Station Rosebud County, Montana



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USGS Digital Orthophotos (sourc: http://www.maps.nris.state.mt.us:8080)
NAD_1983_StatePlane_Montana_FIPS_2500

Each of the Units 3&4 coarse bottom ash ponds is sized to hold approximately two weeks worth of production. The west pond holds approximately 14,000 tons of ash while the east pond holds approximately 18,000 tons of bottom ash. When one pond is full, the slurried ash is diverted to the other pond and the full pond is cleaned. Cleaning involves removing bottom ash from the pond using heavy equipment. The ash is pushed into a stockpile directly adjacent to the pond. The piled ash is allowed to drain, with drainage water returning to the holding pond. The bottom ash is then loaded into haulers that transport the ash to the Units 3&4 Effluent Holding Pond.

Proposed Change in Method of Handling

Presently ash is transported from the storage piles near the Units 1&2 and 3&4 ash handling ponds to the Units 3&4 Effluent Holding Pond. Under the proposed change, some or all of the bottom ash would be transported to other places on-site and off-site to be reused, rather than disposed. Trucks that would transport bottom ash off-site would be filled in the same manner as trucks that haul to the 3&4 EHP, and in the same location. The only difference would be the haul route the off-site trucks would negotiate. This haul route will have the trucks entering the main security gate to be checked and processed. The driver would be told to load at either the 1&2 pile or the 3&4 pile depending on where the equipment operator was loading trucks at the time. The trucks would then proceed to the scale and weigh empty. After getting a green light from security, the trucks would drive to the loading location to be filled (1&2 Route – Figure 3) or (3&4 Route – Figure 4). An equipment operator at the ponds would fill each truck to a safe level. The truck would then return to the scale to get a final weight. The driver would enter the security building and fill out a usage form before leaving the site.

No change would take place in the locations or size of the ponds used to dewater the 1&2 or 3&4 bottom ash. Any bottom ash that is not used for beneficial on-site or off-site purposes would be trucked to the 3&4 EHP.

As initially proposed, bottom ash that had already been disposed of in the Units 3&4 EHP also would be recovered for sale, use and recycling. Figure 1 shows the proposed haul route for bottom ash recovered from the Units 3&4 EHP.

Formation of Bottom Ash

The main energy process at CSES involves coal combustion - a process that takes place in boilers and results in the conversion of coal to energy and other coal combustion products including ash. In the boiler, ash goes through a size segregation. Smaller and lighter ash particles pass with flue gases towards the stacks. Air pollution control devices intercept this fly ash. A second portion (around 35%) of ash falls to the bottom of the boiler. This material, comprised largely of heavier, inert ash materials is called bottom ash. The tangential angle at which the pulverized coal is blown into the boiler creates a swirling fireball in the center of the burn zone. This increases residence time for the combustibles in the coal and enhances combustion

Figure 3. Contractor Truck Routes for Units 1&2 Bottom Ash

At Colstrip Steam Electric Generating Station Rosebud County, Montana

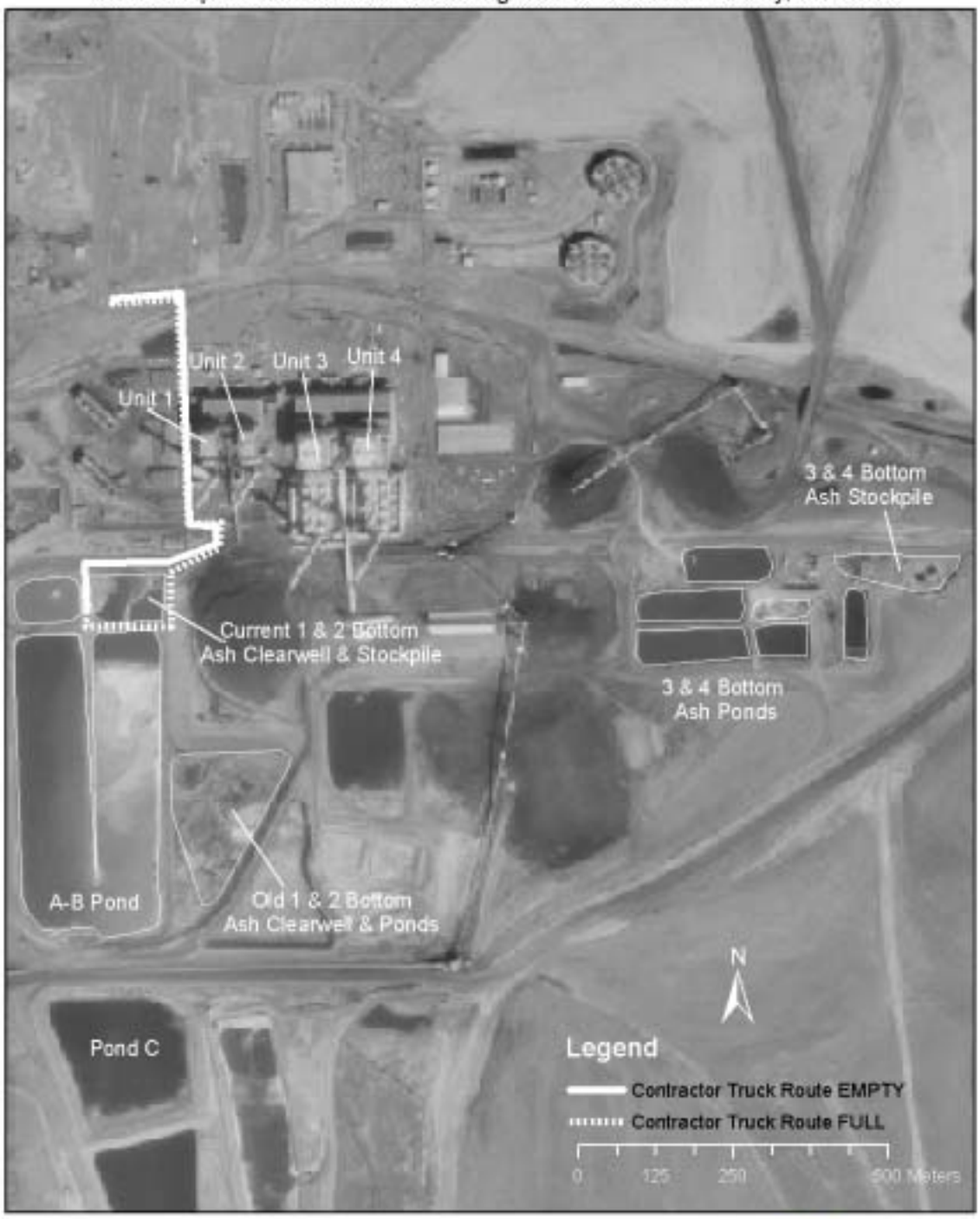

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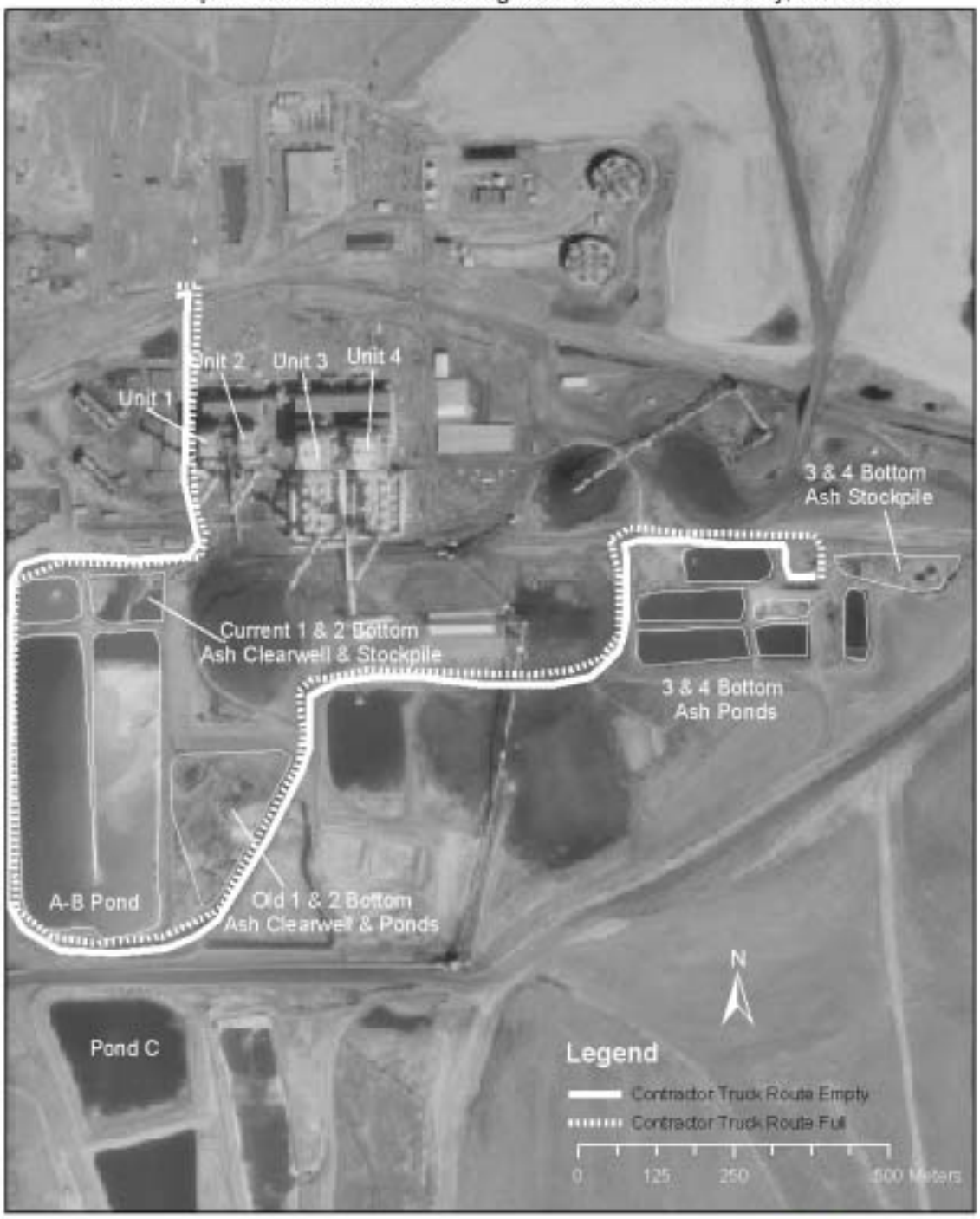
Figure 4. Contractor Truck Routes for Units 3&4 Bottom Ash

At Colstrip Steam Electric Generating Station Rosebud County, Montana



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9

efficiency. The bottom ash that results from combustion falls out of the fireball to the bottom of the boiler.

Bottom ash is a coarse grained material, having the appearance of a commercial sand/gravel mixture but darker in color. Bottom ash consists primarily of oxides of silica, aluminum, iron, magnesium, and calcium that represents over 95% of bottom ash by weight. Bottom ash contains lower concentrations of trace elements, including arsenic, beryllium, copper and vanadium, than fly ash (EPA 1999)[1].

Bottom Ash Quantity

During an average year, Units1&2 would generate approximately 716,000 tons of bottom ash. Units 3&4 would generate approximately 1,767,000 tons. This equates to 511,429 cubic yards for Units 1&2 and 1,262,143 cubic yards for Units 3&4. The tons generated per year are based on the amount of coal burned in each unit, calculations used to separate the ash into fly ash and bottom ash (65% and 35%), and then adding the bottom ash totals for the units together. The conversion from tons to yards was based on Oftedal (bottom ash hauling contractor) truck weights and truck volumes. This conversion was calculated as 2800 pounds of bottom ash per cubic yard.

Stockpiling

Temporary stockpiling occurs at both the 1&2 and 3&4 plant site bottom ash ponds. This allows trucks to haul from the 1&2 stockpile while the dozers clean out the 3&4 holding ponds, and vice versa with the trucks hauling from the 3&4 stockpile while the 1&2 bottom ash is being moved out of the holding pond and stockpiled. The 1&2 stockpile is wedge shaped with a maximum height of 30 feet on the west end. As the ash is pushed up to the taller heights on the west side, the water from the ash flows back into the holding pond. Trucks park on the west side of the stockpile and are loaded by a front-end loader. With daily hauling, this pile is removed within 4-5 days. For larger projects such as highway or road projects, some of the ash from the 1&2 holding pond could be moved to the 3&4 stockpile area to build up a large inventory before the contractor would begin to haul the material off-site.

The 3&4 stockpile area is north of the 3&4 ash holding ponds and has ash moved into the area by front-end loaders. Using front-end loaders to build the stockpile allows for a higher and longer pile. The stockpile area could be 50 feet wide by 300 feet long and still have a 30 foot buffer space between the pile and the main haul road to the north and the operation road to the south. The stockpile could be three lifts high with each lift being 18 feet in height. This would be 30,000 cubic yards or approximately 50,000 tons of bottom ash that could be stockpiled for large projects.

There would be a truck loading area to the west of the stockpile that has enough area to

[1] U.S. EPA Report to Congress. “Wastes from the combustion of Fossil Fuels” Volume 2 – Methods Findings and Recommendations.

allow large trucks the ability to enter the area, turn around, load with ash, and leave on the same route as they came in.

The 3&4 stockpile could stand for a longer period of time to allow more contractors the ability to use this ash off-site for various projects. If a large stockpile was utilized for a long period of time, the surface of the pile could be sprayed with a crusting agent to reduce fugitive dust levels and to prevent erosion of sediments from the pile.

Dust Control

Current dust control practices at the Colstrip facility include magnesium chloride ($MgCl_2$) application to non-paved operation roads, water truck application to roads and off road areas, coal pile sealing, coal dust suppression systems, wet/dry mechanical sweeping of paved areas, and paving of high traffic operation areas.

The truck route for bottom ash hauling is shown in Figure 3 (1&2 Haul Routes) and Figure 4 (3&4 Haul Route). The bottom ash haul routes into the plant will start out on paved areas and then proceed on roads that are treated with magnesium chloride, a control chemical. There would be no impact of additional dust from the trucks that are traveling to the 1&2 or 3&4 bottom ash storage piles. PPLM would water the haul routes when potential to produce dust increases from increased truck traffic or very dry conditions. PPLM has a wet/dry street sweeper that can clean up any spills that may occur within the boundaries of the paved part of the truck route. Any bottom ash spillage that occurs off-site would be the responsibility of the purchaser.

PPLM has been experimenting with a Betz Laboratory lignon product which would be used as a crusting agent on the ash stockpiles if they set up long-term storage for large-scale projects. Normally, the bottom ash coming out of the holding ponds is still damp and does not need any dust control when the trucks are being loaded or as the bottom ash sits in the stockpile awaiting removal.

Off-site Usage Forms

All purchasers of bottom ash from 1&2 or 3&4 ponds would be required to fill out an Off-Site Usage Form (Appendix B). This form would give PPLM a record of who purchased the bottom ash, what the intended use was, location of the project site, and a yearly total bottom ash amount for 1&2 and 3&4.

Project Schedule

If approved, PPLM would begin selling bottom ash to outside contractors immediately. The City of Colstrip has a paving project starting in July of 2004, the US Department of Interior, Bureau of Indian Affairs (BIA) Roads Department of the Northern Cheyenne Tribe has inquired about using the material on the reservation roads in 2004, and various small contractors are waiting for the approval for use of bottom ash in their summer projects.

Project Benefits

The major benefit of allowing bottom ash from Units 1&2 and 3&4 to be used off-site, is the space that would be saved at the 3&4 EHP. The 3&4 EHP, with a projected lifespan of 30-40 years, is approximately 40% full. Extending the life of this pond another 10-15 years would be a great economic stabilizer for PPLM and for eastern Montana. Each year approximately 1,773,572 cubic yards of bottom ash from Units 1&2 and 3&4 are hauled to the 3&4 EHP. Using bottom ash off-site, along with the new paste plant, which started operation in January of 2004, could extend the life of the 3&4 EHP by 20-25 years. The paste plant produces fly ash slurry thickened from a 7% solids to 65% solids material. It is hoped that depositing the paste product will reduce leakage from the Units 3&4 EHP. Less bottom ash being hauled to the 3&4 EHP would mean more room for this paste product. Another benefit would be to lengthen the time before another ash disposal pond would be required in a new area. Delaying the development of a new ash disposal pond would allow additional time for liner and water recovery system technologies to mature further.

Alternatives Considered:

In the checklist, beginning on page 16, the following alternatives are examined. A "Y" or "YES" indicates the potential for an impact to occur and a discussion of the potential impact is found on the right side of the checklist. Longer discussions of potential impacts follow the checklist.

No Action
Under the No Action Alternative, the Department would deny the Applicant's proposed amendment to market bottom ash for off-site beneficial uses. It is assumed that other sources of native sand and gravel would be used in place of bottom ash.

Proposed Action
Approval of the Proposed Action Alternative would allow PPLM to market bottom ash as described in PPLM's notice of amendment.

Approval with Additional Mitigations
This alternative would be the same as the proposed action with addition of the following mitigating measures, which PPLM would have to agree to implement before marketing ash for on-site and off-site use:

1. In lieu of recovering bottom ash that has been exposed to poor quality water in the 3&4 EHP, the bottom ash pond just east of the A/B pond would be used as a long-term stockpile area in preparation for a large off-site project. Prior to use, the area would be cleaned up, leveled, and existing infestations of noxious weeds controlled. If a large stockpile was utilized here for a long period of time, the surface of the pile could be sprayed with a crusting agent to reduce fugitive dust levels and to prevent erosion of sediments from the

pile. Weed control would continue until this storage area is no longer used. Runoff and pond leakage would have to be controlled.

2. If bottom ash is used for on-site purposes and would serve no beneficial use at the end of the life of the plant, the ash would be cleaned up and disposed of.

3. All purchasers of bottom ash from 1&2 or 3&4 ponds would be required to fill out an Off-Site Usage Form (Appendix B). This form would give PPLM a record of who purchased the bottom ash, what the intended use was, location of the project site, and a yearly total bottom ash amount for 1&2 and 3&4. In an annual monitoring report submitted to the Department, PPLM would provide a summary of intended uses, approximate locations of use, and bottom ash usage by intended use.

4. PPLM would be required to give off-site bottom ash users a flyer that would say "Leachate from bottom ash may adversely affect water quality if it is placed in direct contact with state or federal waters or if leachate makes its way to these waters. Users of bottom ash are responsible for obtaining necessary water quality permits if intended use of bottom ash would affect water quality." PPLM would be required to make any changes necessary to their industrial storm water discharge permit before new on-site uses are allowed.

5. PPLM would test distilled water extracts from the bottom ash piles and record water quality in the bottom ash ponds just prior to dewatering the ponds in an effort to better characterize the variability of extracts relative to variable water quality in the bottom ash ponds as indicated by information in annual monitoring reports submitted to the Department. Testing would be done and results reported to the Department at least quarterly for the first two years for Department evaluation.

6. After 2 years and every 5 years thereafter, alternative uses of bottom ash would be reviewed to determine if there are any problems associated with continued alternative uses. If unexpected problems were encountered, PPLM or its successor and the Department would address them. The Board of Environmental Review would resolve any disagreements between the Department and PPLM.

7. PPLM would be responsible for cleanup of bottom ash spills within the plant site.

8. PPLM would bear the cost of monitoring by the Department as allowed by Section 75-20-704, MCA.

Taken together these measures are expected to reduce impacts to insignificant levels.

N = Not present or No Impact would occur. Y = Impacts may occur. U = Impacts are unknown or cannot be predicted. (Explanation under Potential Impacts and Mitigation Measures).

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	N	Y	Y	See additional discussion under item 1 on page 23 at the end of this checklist.
2. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	N	Y	Y	See additional discussion Under item 2 on page 28 at the end of this checklist.
3. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I air shed)?	N	N	N	
4. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	N	U	U	At the plant site no native vegetation would be affected. It is not known where the bottom ash would be used; therefore it is not possible to determine whether vegetation would be affected.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
				Under the Approval with Additional Mitigations Alternative, weeds would be controlled before the old 1&2 bottom ash pond area would be used for a stockpile.
5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?	N	U	U	The stockpile areas on the plant site do not provide much habitat for wildlife. It is not known where the bottom ash would be used; therefore it is not possible to determine whether terrestrial life and habitats would be affected. Under the Approval with Additional Mitigations Alternative, measures would be required that would reduce the potential for fish habitat to be affected.
6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Species of special concern?	N	U	U	None of these resources is located on the plant site that is industrial in nature. It is not known where the bottom ash would be used; therefore it is not possible to determine whether unique, endangered, fragile or limited environmental resources would be affected by off-site use under the Proposed Action or Approval with additional Mitigations alternatives.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
7. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	N	U	U	No undisturbed historical, archaeological or paleontological resources present are present at the plant site. It is not known where the bottom ash would be used; therefore it is not possible to determine whether historical, archaeological or paleontological resources are present off-site.
8. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?	N	U	U	Under the two action alternatives, it is not known where the bottom ash would be used off-site and therefore it is not possible to precisely determine visual impacts. It is unlikely there will be long-term impacts from noise or light.
9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project?	N	N	N	
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?	N	N	N	

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	N	N	N	
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	N	Y	Y	Under the Action Alternatives, use of bottom ash could supplement incomes to those who would use the ash. Bottom ash use could benefit plant operators by prolonging the life of existing ash disposal ponds. Alternative uses of bottom ash also could compete with other sources of sand in the area. Where sand would have to be hauled greater distances than bottom ash, existing sand and gravel operators could be adversely affected by the increased competition.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	N	Y	Y	As indicated under Item 12, there may be a slight impact on existing sand and gravel operators. However it is possible that a few new jobs might be created for those hauling the bottom ash. Overall the impact is expected to be small and not have a major affect on overall employment in the area.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	N	Y	Y	There might be a slight increase in tax revenue if new equipment would be necessary for off-site use of ash. Corporate revenue may benefit from deferring investment in a new ash disposal pond as a result of bottom ash being moved off-site and not taking up space in the 3&4 Effluent Holding Pond. Impacts to state and local tax bases are not expected to be large.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?	N	Y	Y	Under the Approval with Additional Mitigations Alternative there would be a slight increase in the amount of monitoring required by the Department. Under the Approval with Additional Mitigations Alternative, PPLM would be required to reimburse the Department for its monitoring expenses. There might be a slight increase in wear and tear on local roads used to move bottom ash off-site under either of the action alternatives.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	N	N	N	
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?	N	U	U	It is not known where the bottom ash would be used, therefore it is not possible to determine whether recreational or wilderness activities would be affected by off-site use under the action alternatives. Note that bottom ash has been used to enhance recreation by using this material to construct a BMX bike area in Colstrip. No recreation resources would be affected on the plant site that is industrial in nature.
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	N	N	N	It is unlikely that there will be any change to population density, distribution or housing under any of the alternatives.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
19. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	N	N	N	It is unlikely that there will be any change to social structures and mores under any of the alternatives.
20. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	N	N	N	It is unlikely that there will be any change to cultural uniqueness and diversity under any of the alternatives
21. PRIVATE PROPERTY IMPACTS: Are we regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not,	Y	N	Y	Under the No Action and Approval with Additional Mitigations alternatives the Department would regulate the use of private property.
22. PRIVATE PROPERTY IMPACTS: Does the proposed regulatory action restrict the use of the regulated person's private property? If not, no further analysis is required.	Y	N	Y	Under the No Action and Approval with Additional Mitigations alternatives the Department would restrict the use of private property.

IMPACTS ON THE PHYSICAL ENVIRONMENT				
	ALTERNATIVES			POTENTIAL IMPACTS AND MITIGATION MEASURES
RESOURCE	No Action	Proposed Action	Approval with Additional Mitigations	
23. PRIVATE PROPERTY IMPACTS: Does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the restriction on the use of private property, and analyze such alternatives.	Y	Y	Y	The Department considered an alternative that would have denied use of bottom ash that had been stored in the 3&4 EHP and exposed to highly mineralized water. As an alternative to this course of action the Department suggested that the old, unused 1&2 bottom ash pond east of the AB Pond be used. PPLM endorsed this alternative. The Department considered not allowing use of bottom ash because of the limited number of water extract tests on the ash relative to the variability of water quality in the bottom ash ponds. However the Department believes that the additional testing and monitoring along with other measures under the Approval with Additional Mitigations Alternative and a review of the proposal after two years would provide adequate protection for the environment and allow a response should unexpected impacts occur.
24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	N	N	N	

Additional Discussion of Potential Impacts:

Item 1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE.

Under the two action alternatives, PPLM indicates that they would sell, recycle, or otherwise reuse bottom ash for on and off-site beneficial uses. Bottom ash largely consists of environmentally benign materials dominated by silica and aluminum oxides (typically 75% by composition). Oxides of iron, calcium, magnesium, potassium and sodium usually comprise an additional 20% of the bottom ash, leaving only 5% of the material consisting of various trace elements. Potential trace elements include arsenic, barium, beryllium, boron, cadmium, chromium, lead, mercury, silver, and selenium. EPA has determined that bottom ash is not a hazardous material. Results of testing the bottom ash for organic constituents indicate that leaching of organic constituents should not pose any problems. Results of tests for PCB's indicate that levels are below detection limits.

Radiological content of bottom ash is within the range of naturally occurring soil and geologic materials in the Colstrip area; therefore radiation impacts resulting from use of bottom ash are deemed insignificant (see Table 1). No land–use controls over development, population, waste disposal, or special safeguards or monitoring are required for radiation impacts.

Radiological Characteristics of Bottom Ash Compared to Other Natural Materials Near Colstrip

Table 1. Radiological Characteristics of Bottom Ash

IDENTIFICATION	Gross Alpha, pCi/g(1)	Gross Beta, pCi/g(1)	Gross Gamma, pCi/g(2)
Colstrip 3&4 Bottom Ash Fine Average Properties (1996)	1.450 + 0.100	12.867 + 1.233	24.800 + 3.317
Colstrip 3&4 Bottom Ash Coarse Average Properties (1996)	1.250 + 0.100	12.650 +1.267	32.133 + 2.617
Colstrip 3&4 Bottom Ash Combined Average Properties (1996)	1.454 + 0.115	12.700 + 1.208	27.631 + 3.054
Colstrip 1&2 Bottom Ash Combined Average Properties (1996)	2.100 + 0.300	11.700 + 0.700	18.900 + 5.100
Western Energy Company (WECO) Soil (1998)	0.9 + 0.1	8.7 + 0.3	17.7 + 2.5
WECO Overburden (1998)	1.3 + 0.1	12.2 + 0.1	28.1 + 3.5
WECO Scoria (1998)	1.1 + 0.1	8.8 + 0.3	17.3 + 2.3
Colstrip Unit 1&2 Bottom Ash Combined (1998)	1.5 + 0.1	7.9 + 0.3	7.4 + 0.9

REMARKS: The levels of radioactivity found in the samples were within reasonable normal background levels. For comparison, nuclear facilities have to meet a 5 pCi/g standard for gross alpha in order to return a facility to public use. All the samples were well under 5 pCi/g level for gross alpha. In addition, in 1998, a norm determination was done on the gross gamma analysis to help determine the source of the measurement results. The source of measured radioactivity could be traced to naturally ocurring species.

Table 2. Chemical characteristics of water in bottom ash ponds and 3&4 effluent holding pond clearwell

	1&2 BOTTOM ASH CLEARWELL			3&4 BOTTOM ASH POND			3&4 EFFLUENT HOLDING POND CLEARWELL		
	LOW	RANGE HIGH	AVERAGE	LOW	RANGE HIGH	AVERAGE	LOW	RANGE HIGH	AVERAGE
PHYSICAL PARAMETERS									
Spec. Cond. *umhos/cm)	1,550	9,270	5,166	2,740	9,280	4,119	10,800	22,900	16,409
pH Lab (s.u.)	8.0	11.6	9.5	6.4	11.8	10.0	3.2	8.4	7.0
TDS @ 180ºC	1,310	12,000	5,924	1,760	5,180	3,089	13,900	36,000	24,923
Sodium Adsorption Ratio	1.4	4.2	2.3	4.8	13.0	8.5	2.50	4.37	3.33
COMMON IONS									
Total Hardness as $CaCO_3$	1,370	7,720	3,768	643	1,540	985	9,830	24,300	16,588
Calcium (Ca)	226	824	550	188	615	354	446	623	517
Magnesium (Mg)	<1	1,530	518	<1	202	41	2,010	5,530	3,575
Sodium (Na)	126	537	279	187	1,200	559	572	1,570	1,040
Potassium (K)	8	33	17	7	35	18	21	83	60
Alkalinity as $CaCO_3$ Lab	0	339	125	41	1,160	268	0	299	118
Bicarbonate (HCO_3 Lab)	0	141	49	0	326	63	0	365	142
Sulfate (SO_4)	775	7,970	3,790	872	2,830	1,893	10,400	26,600	17,573
Chloride (Cl)	27	161	61	22	90	45	128	463	270
Fluoride (F)	0.13	3.10	1.13	0.29	0.90	0.51	1.80	11.70	6.37
NUTRIENTS									
Nitrate + Nitrate as N	0.73	18.4	7.2	<.05	1.02	0.34	0.06	16.5	6.89
Ortho-Phosphate (PO_4-P)	<0.01	0.28	0.04	<0.01	0.14	0.04	<0.01	0.16	0.07
TRACE ELEMENTS									
Aluminum (AL) Diss	<0.10	2.00	0.27	<0.10	1.80	0.42	<0.1	2.9	1.0
Boron (B) Diss	1.9	52.7	21.7	0.4	6.5	2.5	58.0	131.0	98.7
Cadmium (Cd) Diss	<0.002	0.003	<0.002	<0.001	0.004	0.001	<0.001	0.062	0.025
Copper (Cu) Diss	<0.02	0.5	0.05	<0.01	0.03	0.01	<0.01	0.19	0.03
Iron (Fe) Diss	<0.03	0.15	0.03	<0.03	0.11	0.03	<0.03	0.90	0.31
Lead (Pb) Diss	<0.01	0.22	0.03	<0.01	<0.01	<0.01	<0.01	0.04	0.01
Manganese (Mn) Diss	0.05	6.07	1.64	<0.01	0.12	0.02	1.11	32.00	14.88
Mercury (Hg) Diss	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Nickel (Ni) Diss	<0.02	0.22	0.08	<0.01	<0.01	<0.01	<0.02	0.42	0.11
Selenium (Se) Diss	<0.005	0.054	0.014	<0.005	0.025	0.010	0.052	0.480	0.239
Vanadium (V) Diss	0.080	0.080	0.080	<0.10	0.09	<0.10	<0.10	0.40	0.19
Zinc (Zn) Diss	<0.01	0.45	0.05	<0.01	0.03	0.01	<0.01	0.21	0.03

Note: All quantities in mg/l unless otherwise noted.

Source: PPLM, Environmental Engineering Dept., Colstrip, Montana, 2003

Sale, reuse, and recycling of bottom ash should not present any insurmountable impacts to soils, geology, stability or moisture for off-site uses. Under the Approval with Additional Mitigations Alternative, if bottom ash is used for on-site purposes and would serve no beneficial use at the end of the life of the plant, the ash would be cleaned up and disposed of.

In addition to removing this ash from the bottom ash ponds on the plant site, PPLM proposes to recover bottom ash from the 3&4 Effluent Holding Pond as well. The Department has several concerns with use of bottom ash that has been stored in the EHP and exposed to poor quality water in the pond. First, the quality of water in the EHP is much poorer than water quality in either of the bottom ash ponds and can be highly variable according to information in PPLM's annual monitoring reports. Given the higher concentrations of dissolved minerals in the EHP indicated in Table 2, it is possible that off-site use of bottom ash from the 3&4 EHP could affect soil productivity in areas adjacent to where it is being used. For example at high concentrations boron can limit plant production (see Table 3). Boron concentrations in the EHP clearwell vary from 58 to 131 mg/l. Sodium adsorption ratios in the 3&4 EHP vary from 2 to 4.9 and leachate from bottom ash exposed to water in the EHP may pose a few to moderate constraints to clayey soils exposed to this leachate.

Table 3. Biological Effects of Boron in Irrigation Water

medium	no effect (mg/l)	level of concern (mg/l)	toxicity threshold (mg/l)	Explanation
water	0.5	0.5-10	10	for crops and aquatic plants
	6	6-13	13	for aquatic invertebrates
	5	5-25	25	for fish
			<200	for amphibians
				mg/l = ppm

From: U.S. Department of Interior 1998. National Irrigation Water Quality Program. Guidelines for Interpretation of the Effects of Selected Constituents in Biota, Water, and Sediment. Report No. 3 – Boron

Specific conductivity of water in the 3&4 EHP clearwell ranges 10,800 to 22,900 µmhos/cm (10.8 to 22.9 mmhos/cm). Table 4 indicates salt tolerance of several herbaceous crops. Leachate from bottom ash exposed to water in the 3&4 EHP clearwell may increase soil salinity constraints to the point where crop production is affected.

Table 4. Salt tolerance of herbaceous crops (soil conductivity)

common name	botanical name	threshold dS/m (mmhos/cm)
alfalfa	*Medicago sativa*	2
barley	*Hordeum vulgare*	6
ladino clover	*Trifolium repens*	1.5
orchardgrass	*Dactylis glomerata*	1.5
Durum wheat	*Triticum turgidum*	2.1
crested wheatgrass	*Agropyron sibiricum*	3.5
tall wheatgrass	*Agropyron elongatum*	7.5
beardless wildrye	*Elymus triticoides*	2.7

From: U.S. Department of Interior 1998. National Irrigation Water Quality Program. Guidelines for Interpretation of the Effects of Selected Constituents in Biota, Water, and Sediment. Report No. 3 – Salinity.

Information submitted in PPLM's amendment notice did not adequately characterize the variability of distilled water leachates from bottom ash exposed to EHP water; the application presents only a small sample of the variability that might be encountered. As indicated in Table 2 water quality in the EHP has shown considerable variation over time. PPLM's amendment notice contained leachate test results from only a single sampling. Additional testing is needed before the Department can make an informed decision on this element of PPLM's amendment notice.

The Department is concerned that allowing sale, recycling, and reuse of bottom ash stored in the EHP could eventually delay reclamation of the EHP when it has reached capacity. When the EHP is filled and reaches the end of its useful life, the Department wishes to see it reclaimed expeditiously so that future leakage from the pond and contamination of adjacent aquifers can be avoided.

Allowing sale, recycling, and reuse of bottom ash stored in the EHP as proposed could be interpreted as allowing future recovery of bottom ash stored in the EHP after the EHP is closed and reclaimed. Again the Department is concerned that substantial redisturbance of the reclamation cover, once it is in place, could increase future leakage from the pond.

Because of these concerns over storage and recovery of bottom ash in the 3&4 EHP, under the Approval with Additional Mitigations Alternative, instead of recovering bottom ash stored in the 3&4 EHP, the Department would allow use of the bottom ash storage area east of Unit 1&2 Fly Ash Pond B for additional temporary storage of bottom ash in anticipation of a large project. This area would first have to be cleaned up and weed infestations would have to be addressed before the area is used for additional temporary storage. Runoff and pond leakage would have to be controlled.

Item 2. WATER QUALITY, QUANTITY AND DISTRIBUTION

In a wide ranging study EPA (1999) has concluded that human health risks from coal combustion products handling and disposal in unlined impoundments and landfills were minimal and involved only arsenic following the groundwater and contaminated soil pathways. The impact involved a potential 1 additional cancer per 1,000,000 receptors based on EPA's very conservative health effects approach. Environmental risks were found that involved selenium for mammals, arsenic for birds, and aluminum and boron for amphibians all based on direct contact with waters in ash disposal surface impoundments. It remains unclear whether ash from Colstrip power plants was reviewed in this EPA study.

EPA encourages states to allow beneficial use in lieu of placing the materials in disposal facilities. The following states allow beneficial bottom ash use: Alabama, Delaware, Georgia, Illinois, Iowa, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Virginia, Wisconsin, and Wyoming [3].

PPLM sampled bottom ash from the stockpiles that were pushed out of temporary holding ponds near the generating plants prior to hauling the ash to the 3&4 EHP. These stockpiles represent bottom ash from the units as they ran at full load with no upsets or outside problems. PPLM staff collected a sample of bottom ash from the 1&2 stockpile and the 3&4 stockpile on May 28, 2004. A one-quart sample was taken from each stockpile at three different levels, (top, middle, and bottom) and placed in glass jars. A composite of these three samples was made and sent to Energy Labs in Billings, Montana for a complete analysis using the lowest detection limits possible. This was done to allow parameter comparisons to the national averages from other utilities that are utilizing bottom ash as an off-site construction material. A Toxicity Characteristic Leaching Procedure (TCLP) was used to indicate what quantities of trace metals would be released from the bottom ash when leached with acid or distilled water. The TCLP test is designed to mimic water quality in a landfill where an acid environment is possible. It is unlikely that bottom ash would be used in an acid environment. The distilled water leachate is much more likely to mimic conditions where bottom ash is exposed to rainwater. The results are summarized in Table 5.

In addition Table 5 summarizes results of testing done in 1996 by the former operator of Colstrip Generating Units 1-4, the Montana Power Company, and compares the results to results from similar testing done at coal fired generating plants in the United States. Table 5 also lists the Department's drinking water standards and chronic standards pertaining to aquatic life. While drinking water standards could probably be met, it appears that certain water quality standards designed to protect aquatic life; including chronic standards for aluminum, cadmium, copper, lead, mercury, selenium, silver, and

[3] Association of State and Territorial Solid Waste Management Officials April 2000 Beneficial Use Survey.

Table 5. Comparrison of bottom ash extract to water quality standards

	National TCLP Results Average		COLSTRIP BOTTOM ASH TCLP		COLSTRIP DISTILLED WATER EXTRACT					EPA	MONTANA DEQ		
	National Results Average TCLP (mg/l)	National Results Range TCLP (mg/l)	Colstrip 1 & 2 TCLP Analysis (mg/l)	Colstrip 3 & 4 TCLP Analysis (mg/l)	Colstrip CCB (mg/l) (ppm)	Colstrip 3 & 4 Bottom Ash Fine (mg/l)(ppm)	Colstrip 3 & 4 Bottom Ash Coarse (mg/l)(ppm)	Colstrip 3 & 4 Bottom Ash Combined (mg/l)(ppm)	Colstrip 1&2 Bottom Ash Combined (mg/l)(ppm)	Toxic Waste Limits mg/l	Drinking Water Maximum Contaminant Levels (mg/l)	Chronic Aquatic Life Standard (mg/l)	Analytical Reporting mg/l
PARAMETER													
Aluminum	No Data	No Data	No Data	No Data	3.004	3.333	4.433	4.000	2.000	none	none	0.087[a]	0.1
Antimony	No Data	No Data	<0.05	<0.05	No Data	No Data	No Data	No Data	No Data	none	0.006	none	0.003
Arsenic	0.0058	0.0003-0.0339	<0.20	<0.20	0.005	0.005	0.005	0.005	0.005	5	0.05	0.150	0.003
Barium	0.6	0.067-1.61	<0.60	<0.60	0.652	0.167	1.183	0.648	0.500	100	2	none	0.009
Beryllium	No Data	No Data	<0.004	<0.004	No Data	No Data	No Data	No Data	No Data	none	0.004	none	0.001
Boron	No Data	No Data	6.6	4.3	1.936	2.267	1.067	1.545	1.100	none	none	none	none
Cadmium	0.0079	0.0006-0.0486	<0.1	<0.1	0.001	0.003	0.001	0.002	0.001	1	0.005	0.000616[a]	0.0001
Chromium	0.0079	0.001-0.025	<0.1	<0.1	0.010	0.010	0.010	0.010	0.010	5	0.1	none[f]	0.001
Copper	No Data	No Data	0.01	0.02	0.010	0.010	0.010	0.010	0.010	none	1.3	0.0052[g]	0.0005
Iron	No Data	No Data	0.08	0.38	0.124	0.200	0.193	0.174	0.200	none	0.3[a]	1.0	0.01
Lead	0.0199	0.002-0.08	<0.1	<0.1	0.010	0.010	0.012	0.011	0.010	5	0.015	0.0072[g]	---
Manganese	No Data	No Data	4.36	No Data	0.016	0.018	0.022	0.018	0.040	none	0.05[a]	none	0.005
Mercury	0.004	0.0001-0.0495	<0.006	<0.006	0.001	0.001	0.001	0.001	0.001	0.2	0.002	0.00291	0.0005
Nickel	No Data	No Data	0.05	0.04	0.011	0.012	0.010	0.011	0.010	none	0.1	0.029[g]	0.020
Selenium	0.0051	0.001-0.0495	<0.2	<0.2	0.005	0.005	0.005	0.005	0.005	1	0.05	0.005	0.001
Silver	0.0055	0.0001-0.0495	<0.1	<0.1	0.005	0.005	0.005	0.005	0.005	5	none	0.0041[g]	---
Thallium	No Data	No Data	<0.01	<0.01	No Data	No Data	No Data	No Data	No Data	none	0.002	none	0.003
Vanadium	No Data	No Data	No Data	No Data	0.100	0.100	0.100	0.100	0.100	none	none	none	---
Zinc	No Data	No Data	<0.3	<0.3	0.014	0.010	0.025	0.017	0.010	none	2	0.067[g]	0.010
					COLSTRIP DISTILLED WATER EXTRACT								
Potassium					2.720	3.000	1.000	2.000	1.000		none	none	---
Sodium					20.400	46.333	7.000	27.589	6.000		none	none	---
Calcium					311.440	171.667	54.667	107.923	241.000		none	none	---
Manganese,um					6.080	10.000	1.000	5.154	1.000		none	none	---
Sulfate			467	49	883.320	939.167	81.333	280.692	540.000		none	none	---
Chloride			4	<1	2.480	3.667	1.000	2.385	2.000		4	0.011[i]	---
Carbonate					47.280	6.500	43.000	25.462	28.000		none	none	---
Bicarbonate					22.250	49.500	0.000	22.846	0.000		none	none	---
Total Dissolved solids @ 180°C			830	190	1305.080	820.833	203.500	538.385	961.000		none	none	---
Total Hardness as CaCO3					830.800	469.333	137.667	280.077	604.000		none	none	---
Total Alkalinity as CaCO3					194.000	50.000	90.500	76.154	82.000		none	none	---
Specific Conductance @25°C					1616.760	901.667	308.167	676.846	1300.000		[h]	none	---
pH					9.858	8.933	10.650	9.808	10.600		[i]	[j]	---
Sodium Adsorption Ratio					0.430	0.935	0.258	0.632	0.119		[d]	none	---
Fluoride			0.12	< .10	0.854	0.185	0.100	0.145	0.100		4	none	0.100
Nitrate plus Nitrite as N			< .05	< .05	0.238	0.057	0.050	0.053	0.050		10	[k]	0.010
Ortho-phosphate as P					0.169	0.019	0.023	0.102	2.770		none	[k]	0.001

a. Secondary maximum contaminant level based on aesthetic properties including taste, odor, and staining
b. Limits depend on quality of groundwater and for surface water the standard is location specific (see ARM 17.30.670)
c. Limits in ARM 17.30.601 and 17.30.1001
d. Standard is location specific. See ARM 17.30.670.
e. @ 50 mg/l hardness
f. Chronic aquatic life standard for hexavalent chromium (a 0.011 mg/l
g. @ 100 mg/l hardness
h. Acute aquatic life standard is listed. There is no chronic aquatic life standard.
i. Chronic standard for total residual chlorine
j. This standard is based upon water quality classifications. See ARM 17.30.601 et seq.
k. A plant nutrient which in excessive amounts may affect dissolved oxygen levels

chloride, could be violated if bottom ash was placed in a manner that would put it or rainwater leachate in direct contact with state waters. Several of these chronic standards are dependent upon the hardness of the receiving water and at this time it is not possible to determine which receiving waters would potentially be affected. To address concerns over possible leaching, under the Approval with Additional Mitigations Alternative PPLM would be required to give off-site bottom ash users a flyer that would say “Leachate from bottom ash may adversely affect water quality if it is placed in direct contact with state or federal waters or if leachate makes its way to these waters. Users of bottom ash are responsible for obtaining necessary water quality permits if intended use of bottom ash would affect water quality.”

After 2 years and every 5 years thereafter, alternative uses of bottom ash would be reviewed to determine if there are any associated problems. If unexpected problems were encountered, PPLM or its successor and the Department would address them. The Board of Environmental Review would resolve any disagreements between the Department and PPLM. Taken together these measures are expected to reduce impacts to insignificant levels.

25. Public Involvement: The notice required to accompany an amendment was published in a local paper. Parties to the original certificate proceedings also received a notice describing the proposed amendment. A press release was issued on July 23, 2004 to the State of Montana Newslinks Service when the EA was issued. Copies of this environmental assessment were mailed to parties to the original certification proceeding, affected state agencies, and to nearby landowners. An eight-day period in which to submit comments on the EA will close July 31, 2004.

26. Other Governmental Agencies with Jurisdiction: Off-site users of bottom ash would be responsible for obtaining any permits required by local, state, federal or tribal authorities before the bottom ash could be used.

27. Magnitude and Significance of Potential Impacts: Under the Proposed Action Alternative potential impacts to soil productivity and water quality exist. Under the Proposed Action with Additional Mitigations Alternative, the risk of significant impacts would be substantially reduced. No change in impact is expected under the No Action Alternative.

28. Cumulative Effects: Cumulative effects may occur from use of the ash for on and off-site purposes. The nature of these cumulative impacts cannot be described at this time because the location and nature of these uses is not known.

Recommendation for Further Environmental Analysis:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

Draft Determination: The Department finds and determines that the proposed amendment would affect a new area not addressed in the original environmental impact statement and Certificate.

The Department recognizes the intent and benefits of selling, reusing, and recycling bottom ash for other beneficial purposes. However, the Department has concerns about possible leaching from the bottom ash if it were placed in an area where it could leach into state waters. Additional mitigating measures are proposed that would address these concerns. The Department's recommendation is to adopt the Approval with Additional Mitigations Alternative as described above. For this determination to become effective the Department must issue an order and PPLM must agree in writing to the terms and conditions contained in the amendment.

EA Checklist Prepared By: Tom Ring, Jackie Windon, Kerry Richmond, Craig Jones, and Warren McCullough

Approved By:

_____ _____

Signature Date

PPL Montana

Bottom Ash Chemistry

Units 1 & 2

Date		1/2/2003	1/10/2003	1/19/2003	2/5/2003	2/14/2003	2/27/2003	3/8/2003	5/3/2003	6/19/2003	7/17/2003	7/27/2003
Analyst		RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
Temperature	°C	17	17	17	13	18	22	7	8	16	31	33
pH		9.08	8.88	8.41	8.58	9.26	8.19	8.02	9.20	9.11	8.57	8.29
Specific Conductivity	mmho	2110	2260	2360	1450	1940	5280	993	6180	2380	8000	8620
P Alkalinity	ppm	34	20	10	0	33	0	0	51	38	72	55
M Alkalinity	ppm	80	110	130	131	80	110	162	110	90	139	145
Calcium Hardness	ppm $CaCO_3$	690	610	500	530	750	1600	300	1910	680	1560	1650
Magnesium Hardness	ppm $CaCO_3$	190	180	160	170	190	900	300	1670	210	3540	3710
Scale Inhibitor	ppm	6.1	5.4	1.4	3.8	1.9	?		12.1	5.6	1.4	2.0
Inhibitor Pump Stroke	%											
Sulfate*	ppm											
Silica*.	ppm											

* Analysis only upon special request

Comments:
2/27/2003: will report on 2-28
3/8/2003: scale inhibitor regent being questioned
7/17/2003: pond sample taken
7/27/2003: pond sample taken

PPL Montana

Bottom Ash Chemistry

Units 3 & 4

Date		1/2/2003	1/10/2003	1/19/2003	2/5/2003	2/14/2003	2/27/2003	3/8/2003	5/3/2003	6/19/2003	7/17/2003	7/27/2003
Analyst		RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
Temperature	°C	18	17	17	12	16	13	6	8	18	30	30.5
pH		11.13	11.07	11.04	11.86	11.06	10.37	12.28	9.57	10.06	11.15	10.6
Specific Conductivity	mmho	2310	2100	1390	3480	2490	2520	3000	2710	2880	3740	3600
P Alkalinity	ppm	80	95	118	435	99	59	400	45	86	300	234
M Alkalinity	ppm	110	130	145	45	140	85	410	102	112	333	260
Calcium Hardness	ppm $CaCO_3$	90	920	820	1180	950	880	1200	980	1010	1000	950
Magnesium Hardness	ppm $CaCO_3$	80	70	60	20	10	200	100	120	90	0	0
Scale Inhibitor	ppm	2.8	4.3	2.3	2.4	0.37	3.6		4.6	3.4	2	1.8
Inhibitor Pump Stroke	%											
Sulfate*	ppm											
Silica*	ppm											

* Analysis only upon special request

Comments:
3/8/2003: scale inhibitor regent being questioned
7/17/2003: pond sample taken
7/27/2003: pond sample taken

PPL Montana

Bottom Ash Chemistry

Units 1 & 2

Date		8/12/2003	8/21/2003	9/1/2003	9/29/2003	10/8/2003	10/19/2003	11/4/2003	11/12/2003	11/24/2003	12/30/2003	
Analyst		RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	
Temperature	°C	29	26		26	24	26	19	18	14	22	
pH		9.15	8.85		9.39	9.43	9.26	8.68	9.04	8.76	8.12	
Specific Conductivity	mmho	6020	1600	6670	6460	6460	6680	6080	5970	6330	7910	
P Alkalinity	ppm	60	52	52	58	56	61	64	56	45	50	
M Alkalinity	ppm	105	120	111	129	136	142	165	154		160	
Calcium Hardness	ppm $CaCO_3$	1640	1630	1620	1790	1810	1790	1660	1740	1470	1410	
Magnesium Hardness	ppm $CaCO_3$	1720	2330	2600	1810	1900	1880	2200	2000	2130	4490	
Scale Inhibitor	ppm	1.6	1.8	1.8	2.2	2.0	2.4	3.6	2.8	2.6	2.6	
Inhibitor Pump Stroke	%											
Sulfate*	ppm											
Silica*	ppm											

* Analysis only upon special request

Comments:
8/12/2003: pond sample taken
8/21/2003 pond sample taken

PPL Montana

Bottom Ash Chemistry

Units 3 & 4

Date		8/12/2003	8/21/2003	9/1/2003	9/29/2003	10/8/2003	10/19/2003	11/4/2003	11/12/2003	11/24/2003	12/30/2003	
Analyst		RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	
Temperature	°C	28	24		26	26	26	13	15	14	22	
pH		11.52	10.98		11.72	10.96	11.6	11.17	11.41	10.74	11.08	
Specific Conductivity	mmho	5040	2730	2710	3290	2980	3300	2730	2190	2630	2730	
P Alkalinity	ppm	620	164	63	210	214	220	246	109	88	164	
M Alkalinity	ppm	643	193	106	232	240	230	280	137	113	185	
Calcium Hardness	ppm $CaCO_3$	1290	730	666	910	870	1010	861	670	670	760	
Magnesium Hardness	ppm $CaCO_3$	0	0	14	0	0	0	40	50	50	60	
Scale Inhibitor	ppm	1.5	2	1.8	2	2.1	2.4	2.6	2.5	2.4	2.2	
Inhibitor Pump Stroke	%											
Sulfate*	ppm											
Silica*	ppm											

* Analysis only upon special request

Comments:
8/12/2003: pond sample taken
8/21/2003: pond sample taken

PPL Montana

Bottom Ash Chemistry

Units 1 & 2

Date		1/18/2004	2/4/2004	4/4/2004	5/19/2004	5/26/2004						
Analyst		RK	RK	DS/KP	RK	RK						
Temperature	°C	21	18	19	24	28						
pH		8.71	9.00	8.70	9.05	8.97						
Specific Conductivity	mmho	7810	5460	9580	8170	8150						
P Alkalinity	ppm	60	65	70	90	85						
M Alkalinity	ppm	188	142	215	180	170						
Calcium Hardness	ppm $CaCO_3$	1560	1600	1430	1720	1670						
Magnesium Hardness	ppm $CaCO_3$	4140	1960	6420	3560	3050						
Scale Inhibitor	ppm	2.8	2.6	3.1	2.7	1.7						
Inhibitor Pump Stroke	%											
Sulfate*	ppm											
Silica*	ppm											

* Analysis only upon special request

Comments:
5/19/2004: pond sample taken

PPL Montana

Bottom Ash Chemistry

Units 3 & 4

Date		1/18/2004	2/4/2004	4/4/2004	5/19/2004	5/26/2004							
Analyst		RK	RK	DS/JO	RK	RK							
Temperature	°C	21	14	20	24	20							
pH		11.72	11.74	11.6	9.59	9.83							
Specific Conductivity	mmho	4230	3170	3420	2800	2660							
P Alkalinity	ppm	170	395	260	45	72							
M Alkalinity	ppm	240	410	290	75	109							
Calcium Hardness	ppm $CaCO_3$	1380	1140	1130	820	861							
Magnesium Hardness	ppm $CaCO_3$	0	0	0	0	1							
Scale Inhibitor	ppm	2.6	2.4	4.4	4.5	5.1							
Inhibitor Pump Stroke	%												
Sulfate*	ppm												
Silica*	ppm												

* Analysis only upon special request

Comments:
5/19/2004: pond sample taken

Appendix B Off-site Usage Form

PPL – Montana Colstrip Plant Bottom Ash Shipping Record

Date	Weight (tons)	Firm	Driver's Name	Destination	Use

Note – Be sure driver has or is given most recent Bottom Ash Material Safety Data Sheet